UNITED STATES DISTRICT COURT

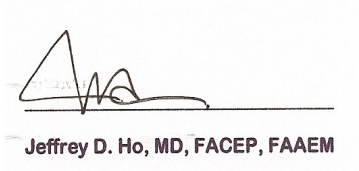
EASTERN DISTRICT OF NEW YORK

MARY HOLLMAN, as Administrator of the Estate of SAMUEL A. COX, and the estate of SAMUEL A. COX, on behalf of decedent JOHN COX,, Plaintiff vs. TASER INTERNATIONAL, INC. Defendants.	CV-06-3588

DECLARATION OF JEFFREY D. HO., M.D., FACEP, FAAEMP

I, Jeffrey D. Ho, being of legal age and under the penalties of perjury, state as follows:

1. I am a competent adult and have personal knowledge of the following facts.
2. Attached hereto is a true accurate copy of my expert report in the Hollman v. TASER International, Inc., Case No.CV-06-3588 litigation.
3. The report summarizes my analysis and findings and includes a statement of my opinions. The report also includes data and other information considered by me in forming my opinions and sets out my qualifications (including my resume).
4. My opinions are expressed to a reasonable degree of professional certainty.
5. I affirm under the penalties of perjury that the foregoing statements are true and correct.



August 10, 2009
Date

Case: Hollman, et al. v. TASER International, Inc.

***Introduction**

I have been retained as an expert medical consultant on behalf of the Defendant, TASER International, Inc. (TASER) for this case. I have been asked to provide my opinions on sudden, arrest-related death and about the effects of the electrical output from a TASER® electronic control device (ECD or device) on human physiology and what its human effects were in this particular case. My opinions offered in this case are rendered to a reasonable degree of medical certainty or probability.

I reserve the right to supplement or modify this statement if and when I acquire additional relevant information prior to the time of trial.

***Qualifications**:

I am a practicing, residency trained and board-certified emergency medicine physician and hold an academic appointment at the University of Minnesota Medical School. I am a Fellow of the American College of Emergency Physicians and the American Academy of Emergency Medicine. I also hold a full-time peace officer license in the State of Minnesota and currently work as a deputy sheriff. I have previous experience as a firefighter/emergency medical technician (EMT) and have fellowship training specifically in the area of emergency medical services (EMS)/pre-hospital emergency care. I have 9 years of reserve military service as a medical corps officer and I currently serve as a medical director to EMS agencies in the upper Midwest. I am also an expert

medical research consultant on arrest-related death issues to TASER International, Inc. and maintain certification as a TASER ECD Instructor. My area of expertise includes research in the area of sudden and unexpected death in law-enforcement related incidents and also the physiologic effects of ECDs. I have conducted numerous research studies on these devices and have had my work published in peer-reviewed medical journals and have presented at national/international meetings and assemblies on these topics. I have been allowed to provide expert opinions on TASER ECD effects on human subjects in other legal cases both nationally and internationally. My opinions in this case are based on the above qualifications. In addition to these qualifications, I will refer interested persons to my attached curriculum vitae for further qualifications and information.

***Publications in the last 10 years**:

Please refer to my curriculum vitae for a listing of publications.

***Compensation**:

Hourly billing rate: $375.00 per hour for time spent actively working on this case (reviewing, writing, testifying, providing deposition) regardless of location.

Travel Billing Rate: $375.00 per hour during business hours (8a-5p) and $187.50 per hour during non-business hours (5p-8a) for travel time for purposes of business related to this matter. Travel expenses are to be reimbursed. Domestic first class travel will be allowed for commercial travel over 6 hours from home station.

Exhibits to Be Used at Deposition and Trial

Exhibits to be used at deposition include, but are not limited to: all referenced documents and other resources listed herein or in each particular document; videos of ECD research; videos of resistive subjects; explanatory and/or demonstrative charts and/or graphs; PowerPoint® or Keynote® presentations regarding ECDs; research equipment; and demonstrative aids and devices.

***Previous testimony or deposition as an expert within the last 4 years**:

1. Rosa v. TASER July 2009-deposition; expert for the defense, civil wrongful death case)
2. Braidwood Inquiry, Vancouver, Canada (May 2008-testimony, May 2009-testimony)
3. Lee v. City of Nashville, et al. (August 2008-deposition, April 2009-court testimony; expert for the defense, civil wrongful death case)
4. Nelson v. Orange County Sheriff's Office. (July 2008-deposition; expert for the defense, civil use of force case)
5. Oliver v. City of Orlando, FL, et al. (June 2008-deposition; expert for the defense, civil wrongful death case)
6. TASER v. Summit County, OH Medical Examiner, et al. (April 2008; expert for the plaintiff, wrongful decision case)
7. Morrison v. Muskingum County Sheriff Robert J. Stephenson, et al. (October 2007-deposition, February 2008-court testimony; expert for the defense, civil use of force case)
8. Lomax v. Las Vegas Metropolitan Police Department, et al. (October 2007; expert for the defense, civil wrongful death case)
9. Heston v. City of Salinas, CA, et al. (June 2007-deposition, May, 2008-court testimony; expert for the defense, civil wrongful death case)
10. Giannetti v. City of Stillwater, OK (August, 2005; expert for the defense, civil wrongful death case)

11. United States of America v. Jason Malone (July, 2005; expert for the prosecution, criminal evidence suppression and use of force case)

12. Walker v. City of Edina, MN (August, 2004; expert for the defense, civil wrongful death case)

***Case Specific Reviewed Documents or Materials**

1. Autopsy Photos 1-5, Gross Specimens, Overhead Photos
2. Autopsy Report part 1 and part 2
3. Thanning Medical Consulting Autopsy Report
4. Deposition of Officer Doherty
5. Deposition of Officer Neknez
6. Deposition of Officer McManus
7. Deposition of Officer Myers
8. Deposition of Officer Fitzpatrick
9. Deposition of Kevin Lixfield
10. Deposition of Patrick Smith
11. Deposition of Robert Stratbucker
12. Deposition of Magne Nerheim
13. Deposition of Rick Guilbault
14. Deposition of Plaintiff Hollman
15. Errata Sheet of Deponent Hollman
16. Deposition of EMT Daniel Totong
17. Deposition of EMT Lindsey Smith
18. Deposition of Dr. Joseph Sachter
19. Deposition of Carol Burke
20. Deposition of Patrick Orlando
21. Plaintiff's Disclosure
22. Rule 26 Disclosure of TASER International
23. Supplemental Rule 26 Disclosure of TASER International
24. Brookhaven Hospital Record
25. Brookhaven Ambulance Company Incident Record
26. Pre-hospital Care Report
27. Social Security Administration Documents
28. Plaintiff Complaint
29. Plaintiff Amended Complaint
30. Police Department Internal Investigation Letter and Report
31. Police Department Use of Force Report (Doherty)
32. Police Department Use of Force Report (Lixfield)
33. Injured Employee Report (Lixfield)
34. Supplemental Report of Officer Beseler
35. Supplemental Report of Officer Campbell
36. Supplemental Report of Officer Doherty
37. Supplemental Report of Officer Hannafey

38. Supplemental Report of Sergeant Lixfield
39. Supplemental Report of Officer Musmacker
40. Supplemental Report of Officer Neknez
41. Supplemental Report of Officer Popieraski
42. Supplemental Report of Officer Ryby
43. Supplemental Report of Detective Ciccotto
44. Supplemental Report of Detective Tavares
45. Supplemental Report of Officer Posillico (7/05 and 4/06)
46. Police Department Death Report
47. Forensic Sciences Crime Lab Report
48. Rountree Witness Statement
49. Toney Witness Statement
50. Daryl Harris Witness Statement
51. Georgia Harris Witness Statement
52. Blunt Witness Statement
53. Mary Hollman Witness Statement
54. Orlando Witness Statement
55. Lenord Witness Statement
56. Lindsey Smith Witness Statement

***Case Summary:**

The decedent in this case, John Cox (JC), had a Body Mass Index (BMI) of 35.4 at the time of his autopsy that placed him in the "obese" category per federal standards.[1] JC had a long history of alcohol and illicit drug abuse, specifically cocaine. He also had a long history of psychiatric illness involving psychotic disorders and paranoia with multiple hospitalizations. There is documentation that supports JC being "violent many times" in the past, occasionally "bugging out" and requiring psychiatric prescription medication.[2] [3] [4]

On April 22, 2005 at approximately 1930 hours, JC was inside of a residence exhibiting violent and destructive behavior described as "bustin' up the house". It is reported that several persons inside the home (including an elderly female and some children) were fearful of him and his behavior. Police were summoned by concerned friends and family

members to control the situation. It was reported that his violent behavior was precipitated by consuming alcohol. He was not supposed to consume alcohol because of the health medication he was taking to keep him calm. JC's behavior was described as violent and self-destructive. He struck himself several times in the head and chest and was bleeding from the head prior to the arrival of law enforcement authorities. Adult persons within the home attempted to restrain JC prior to the arrival of law enforcement but were unable to do so because of his strength and intensity. His speech at this time was described as non-sensical and he made statements that he was the "Black Jesus", he was the "Father God" and that he "owned the world".[4] [5] [6]

Arriving law enforcement officers found JC to be violent, agitated, threatening (took a combative stance), and injured (was noted to be bleeding from the face). JC made profane statements to the officers and challenged the officers to a physical confrontation.[7] [8] The officers requested additional help including a supervisor to respond with an ECD. Eventually, 2 TASER® X26™ ECDs were available at the scene.

A total of 9 officers were required to control JC due to his profound agitation. JC was described as cursing and being very agitated throughout the entire encounter. Several officers sustained injuries during this encounter including a bite wound and a broken bone. During the encounter, 2 ECDs were applied to JC. The first was in deployed probe mode by Sgt. Lixfield to the chest that was reported to be ineffective and JC removed the probes at some point during or after the application attempt. Sgt. Lixfield changed the ECD cartridge and attempted to deploy it a second time but had an accidental discharge

into his own hand and JC received no electrical current delivery from this. Sgt. Lixfield's ECD shows a total of 10 trigger "pulls" and it is reported that the 8 remaining application attempts to JC were in the drive stun mode to the legs, buttocks and back. All applications were reported to have little if any effect. The final application was a drive stun ECD application to the low back by Officer Doherty that allowed JC to be secured to the ambulance gurney. (ECD download report indicates a total of 110 seconds of attempted electrical charge delivery was made from the 2 devices over an 18 minute time period. There is indication that JC did not receive all of this attempted current delivery since attempt #2 was discharged into Sgt. Lixfield and many of the others were described as having no effect which leads to a question of adequate contact.) JC was then transported to the hospital but continued to be agitated on the gurney despite restraints being in place. His agitation required 3 police officers to also accompany JC and the emergency medical technician during the transport for continued safety and control. There was no ECD application made after JC had been placed into the ambulance. Emergency Medical Technician (EMT) Smith was responsible for patient care and reported in a statement that JC was agitated and resistive until approximately 1 minute prior to arrival at the hospital at which point he seemed to calm down. Once he was at the hospital, he was noted to be in cardiorespiratory arrest upon transfer to the hospital bed.

Full resuscitative measures were initiated. The initial cardiac rhythm noted was asystole by the emergency physician. This was confirmed during the resuscitation by cardiac ultrasound. There were defibrillatory attempts made during the resuscitation by the

physician in case the rhythm interpretation had been confused with fine ventricular fibrillation (VF). These attempts were not successful. The recorded blood pH was 7.22. JC was noted to have 0.28 grams of rock cocaine in his possession at the time of his death. JC was unable to be resuscitated.

At autopsy, JC was noted to have cardiomegaly/left ventricular hypertrophy (450 grams), a severe narrowing of 2 coronary arteries (95% left main; 70% proximal left circumflex), and the presence of cocaine and cocaine metabolites in his system. The autopsy performed by the Suffolk County Medical Examiner's Office listed the cause of death as excited delirium syndrome. It also listed cocaine intoxication, arteriosclerotic and hypertensive type cardiovascular disease, and chronic psychotic disorder as contributory causes. The manner of death was listed as accidental. Dr. Lone Thanning conducted a second forensic autopsy. This concluded that the immediate cause of death was due to acute cardiac dysrhythmia/ventricular fibrillation with a proximate cause of repeated TASER device exposures with beating, stomping and choking injuries. Associated conditions were noted to be non-specific psychosis and focal coronary atherosclerosis.

Opinion

I have been asked to specifically address the physiologic effects of a TASER ECD application to humans in this report as well as provide an opinion on certain aspects of arrest-related sudden death. In this case, there is evidence and supporting law enforcement documentation that are consistent with a TASER X26 ECD having been

discharged in both deployed probe and drive stun mode to JC during a restraint and control process. The 2 probe deployments were noted to either be ineffective (JC removed the probes) or did not make contact (accidental discharge into Sgt. Lixfield). The remaining drive stun applications were to the legs, back and buttocks and were largely described as ineffective. The final application was a drive stun to the low back that occurred many minutes prior to JC's reported cardiorespiratory arrest. All ECD applications occurred within 18 minutes and it is known that although the ECD was activated 11 times for a total of 110 seconds within this time period, JC did not receive all of these activations.

Before giving opinion on the specifics of this case, it is important to note that in general, there is nothing that exists to date scientifically to support a causal connection between ECD application in humans and sudden, unexpected death. There are several general conditions that are strongly associated as risk factors in custodial sudden deaths such as agitated, delirious behavior, underlying cardiomegaly, underlying psychosis and antipsychotic drug treatment, cocaine abuse and underlying coronary artery disease.[9] [10] [11] [12] [13] [14] [15] [16] JC had all of these present in his history and/or at the time of his death. These conditions are known to be independent of ECD application and all were present in this case.

In this unfortunate case of JC, it is important to address the logic of the situation before getting into the specific physiologic consequences. The issue to consider is whether or not inappropriate logic is being utilized when examining allegations of a possible

association between ECD use and the sudden death (SD) event. Because the SD event followed shortly after an ECD was used, it is tempting to draw an association between the two simply because of their close association by time sequence. This logical fallacy is known as *post hoc, ergo propter hoc* ("after this, therefore because of this"). A simple but obvious example of post hoc, ergo propter hoc logic would be when roosters crow in the morning - shortly after the rooster crows, the rising of the sun occurs. Using post hoc, ergo propter hoc logic would lead one to believe that the two events described are related because they occur close together in time. The two events are obviously not related and if the rooster doesn't crow the sun still rises. The problem with making a simple time association as the basis for one's logic is that time association does not necessarily establish causation. In order to establish causation, many other factors need to be considered, such as the probability of chance, the inherent diurnal nature of roosters that causes the rooster to crow in the morning and the fact that the sun will rise every morning because of the laws of the solar system. After considering these other factors, it is clear that the crowing of the rooster and the rising of the sun are not causally related at all. While this example may seem absurd, I use it to demonstrate an actual error in logic that mankind has made in the past. It is also applicable to SD cases such as this one since it is also this type of logic that is wrongly inferred in cases like this without regard to what the body of science shows.

The scientific process examines individual factors and scrutinizes them to determine if they are somehow related to the issue in question. This same scientific process also needs to be applied in cases that attempt to temporally link an ECD application with a SD

event. Failure to do so only yields uninformed and unsupported speculative opinions and potentially faulty conclusions. Another logical fallacy that comes into play in this type of situation is that of *causal oversimplification* or looking to assign causal blame on any item or tactic that is used while disregarding JC's underlying health and drug abuse history. It also disregards JC's decision to resist and fight with family, friends and law enforcement officers. Violent, volitional activity such as this is not without risk of self-harm or death from exacerbation of underlying medical conditions and/or reception of personal injury. This is independent of ECD involvement.

Additionally, the use of this logic causes one to ignore the obvious. While it is true that JC died in the presence of law enforcement personnel, it is important to remember that this is only true because their presence was necessary due to JC's behavior. JC's own decisions and actions (decision to embark upon significant strenuous and resistive behavior) placed him at significant risk of sudden death. It is believed that persons with psychotic conditions similar to JC are at elevated risk for sudden death in situations that place them at elevated physical stress.[17] It is also known that having the underlying health and drug abuse conditions that JC did place a person at significant elevated risk for sudden death.[9] [10] [11] [12] [13] [14] [15] [16] In these situations, deaths such as JC's also occur unattended by law enforcement and may occur even in the presence of medical professionals. The salient point is that the presence of law enforcement or use of an ECD is not a dependent variable in these types of deaths.[18]

The concept of inappropriate logic in this case cannot be overstated. Inappropriate logic is the exact reason why so many people unjustifiably believe that ECD use and SD events are related. This applies not only to laypersons but also to educated professionals such as law enforcement officers, city officials, attorneys and physicians. It is very easy to make these associations when events or concepts are not easily understood. In fact, the concept of flawed logic as it relates to medical conclusions and also to SD events has been pointed out in the past.[19] [20] ECDs and SDs are not simple devices or concepts and therefore tend to be at high risk for misunderstanding and inappropriate logic. It is important to keep in mind that to understand the relationship between 3 factors (in this case, human physiology, SD in humans, and ECD applications), one should have a good understanding of all. Simply understanding the human body, the ECD, or SD separately and independently does not necessarily qualify persons to speak intelligently on the 3 in combination.

Before first considering what occurs at a cellular or base level in human physiology, it is important to provide information about how a TASER ECD operates. There is often confusion surrounding this because an ECD, by definition, utilizes low current delivered, brief duration pulsed electrical charges to accomplish its intended task. Unless a person has had specific training in ECD electrical principles, this confusion often leads to inappropriate assumptions or conclusions. Furthermore, this confusion is often perpetuated by media sources in the public domain. (e.g. A national, daily publication read by thousands of people ran a front page article on June 3, 2005 that compared and *incorrectly* showed an ECD to have even greater electrical current output than that of the

judicial electric chair used for capital punishment. The reported output of the ECD was off by a factor of 1 million.)[21]

I have significant experience in dealing specifically with many of the ECD electrical principles in my realm of human research and medicine. I have personal experience as an emergency physician in caring for patients who have experienced a non-ECD associated SD event several times in my career. Many of these patients have had similarities to the case in question. In this case, Plaintiffs allege that the ECD caused or contributed to this death. There are several factors that are necessary for delivered electrical charge to cause damage to the human body. These include quantity of delivered electrical charge, location of charge delivery, method of delivery, charge density, etc. One aspect that needs to be discussed is voltage. In laypersons language, voltage is a measure of the pressure that is pushing electrons down a certain path. This voltage, if high enough, can cause electricity to "arc" through open space or through clothing. (e.g. in a dry environment when a person walks across the carpet in socks and goes to touch a metal doorknob, the person often receive a "static" shock to their hand even before the hand has touched the knob. This jumping or "arcing" of the shock from the hand to the knob occurs because of the higher voltage involved, often at least tens of thousands of volts but there is no danger here due to the very low delivered charge involved. Amperage is another component and represents the flow or the total number of electrons flowing per second along a given path. This component is necessary at a relatively high number to cause physiologic damage in a human. (e.g., A typical residential wall outlet will only have a constant output of about 110 volts (V) but up to 16 amperes (A) of sustained

current available. This is why it can be dangerous for humans to come into contact with it and also why electricity does not arc out of the wall.) By comparison, the TASER X26 ECD used in this case generates a peak arcing (not delivered) voltage of up to 50,000 V (to be able to arc across a 50 millimeter (mm) air space or through clothing if necessary) but delivers a peak voltage of only about 2,400 V (dependent upon the load) with maximum average delivered current of approximately 0.0021 A. Perhaps the most pertinent concept to keep in mind with regard to this case is that higher voltage with very low amperage is not known to be dangerous to humans from a scientific standpoint.

Another more concrete way to understand these concepts is to compare the energy delivered from a TASER X26 with that of a commonly used medical device, the emergency cardiac defibrillator which is used by laypersons and medical personnel alike to deliver life-saving shocks to patients in cardiac-arrest states. Defibrillator energy is usually characterized in terms of "Joules" (J) that is the International System of Units measurement of energy (mechanical, electrical, or thermal) describing the energy delivered in a single pulse. It is important to understand that a single J is a very small amount of energy. Emergency external cardiac defibrillators typically deliver electrical energy in the range of 150-360 J. The TASER X26 delivers about 0.1 J per pulse. The minimum energy recommendation, measured in joules, by the American Heart Association (AHA) to be used in common medical situations to generate a physiologic change at a cellular level is at least 1 J/kilogram (Kg) which would be about 65-90 J for an average adult. (In JC's case it would be 109 J) Additionally, the AHA recommends only 3 positions of defibrillator electrode placement to maximize the electrical current

reaching the heart to cause an effect.[22] None of these 3 positions resembles the area of probe impact or drive stun on JC (the closest was the first probe deployment to the "mid-chest" that had no effect and the probes were removed by JC as he continued to resist). This is notable because any allegation of causation in this case needs to be made at least partially based on ECD energy and probe landing position. The level of energy in a cardiac defibrillator that is the minimum recommendation by the AHA to effect a physiologic change is significantly more than what JC was exposed to from the ECD during the incident in question and is intended to be delivered in a different position and from larger electrodes than from what JC experienced. There is now a plethora of human data showing that human exposures to ECDs do not yield findings of cardiac abnormality in exposure situations that even remotely mimic what occurred in this case, as measured by serum biomarkers, electrocardiograms, and echocardiography (see references below).

It is significant that JC's distress did not occur immediately after the final ECD application and that the noted cardiac arrest rhythm was asystole when evaluated by medical personnel shortly after noting his distress. These facts do not support the ECD contributing to JC's death. While sufficiently strong delivered electric charge to the heart can lead to some pulsatile arrhythmias, it is understood in medicine that if an electrical charge causes death by electrocution, it does so by inducing 1 of 2 very specific rhythms known as ventricular fibrillation (VF) or asystole.[23] Since asystole is only expected after massive current exposures (such as a lightning strike), it is not what we expect as a result of applied electricity of small magnitude as in this case. VF would be the expected result from an ECD application. This was not what was recorded to have occurred in this case

immediately upon collapse. Therefore, there is no support for the ECD causing a situation of cardiac arrest in this case. Additionally, death by electrocution is generally known to be relatively instantaneous. Electricity is not stored up in the body and somehow released at some later time causing a cardiac arrest. The fact that JC exhibited signs of life with continued resistance and agitation for some time after the final ECD application do not support a causal connection. JC's death as described is, however, quite consistent with those that are due to extreme acidosis states induced by delirious and continued resistive behavior.[24] The acidosis worsens over time as the behavior continues. This mechanism of death is very likely in this case and is also complicated by the significant coronary artery lesions found at autopsy that restrict necessary blood flow to the cardiac tissues. This physiology is totally independent of the application of an ECD.

The presence of the 2 coronary artery lesions found at autopsy should not be underestimated. They have the ability to cause sudden death all by themselves especially when combined with exertional behavior. They represent a very large underlying risk factor known to be responsible for sudden deaths in similar circumstances.[25] Additionally, the volitional resistive and exertional behavioral that JC demonstrated has been associated with triggering sudden death in untrained individuals such as JC.[26] The presence of and the dangerous pathophysiology that these lesions and JC's volitional behavior represent are independent of the use of an ECD.

From a human physiologic standpoint, there is no harm that has been found to be associated with an ECD exposure. There have been several human studies looking at

many factors of cellular physiology associated with ECD exposure and no dangerous short or long-term findings have been apparent.[27] [28] [29] [30] [31] [32] [33] [34] Some of these studies were conducted with discrete 5-second exposures and some were conducted with exposure times that were even longer. Additionally, there are now studies that have looked at specific methods of application such as the "drive stun" that may mimic what occurred in this case. This follow-up research has also not shown a clinically relevant or concerning finding with regard to changes in human physiology.[35] Of note, one of the above studies examines the effect of ECD application directly over the heart.[33] This is significant because it gives exposure in an area that is considered by some experts to be even more potentially dangerous than where JC received his probe applications and no deleterious effect was found. The above studies have been conducted in corporately sponsored research as well as independent and government funded research groups and the findings have been similar and consistent. Furthermore, the studies from Ho et al have utilized human subjects so there is the high likelihood of better correlation between this type of modeling than studies where animal models have been utilized. This point has been acknowledged by animal researchers in this field.[36]

With regard to recent animal model research, it is relevant to discuss this for the sake of thoroughness and to be fair. There have been studies using animal models (particularly swine) that have demonstrated concerning results and have led to cautious conclusions.[37] [38] [39] It is important to recognize this animal research for what it is. Animal models allow researchers to examine questions that ethically or realistically could not be done utilizing human models. Additionally, animal research is valued in science as it often points the

scientific investigatory process in certain directions. However, there are restrictions to this type of research when examining ECDs that need to be understood. First, ECDs are designed to be used on humans. In the case of JC, the ECD application was made to a human. Second, the animal research realm introduces a fair amount of artificiality to the research process. For example, due to requirements of humaneness, animal research of this type can usually only be done on animals that are under general anesthesia. In this condition, animals do not breathe without the assistance of life-support ventilator machinery. In the animal ECD studies cited, during ECD exposure, the animal was taken off of the ventilator or the ventilator was stopped during ECD exposure. One of the results of this was that the animals did not receive life-support breathing while they were in a state that required it. Another result was that ECD applications could cause fatal heart rhythms in some of the animals under certain conditions. These results have received much discussion by others since it is believed that this was the first indication that ECD exposure prevented breathing and caused the heart to stop. This was touted as an induced suffocation or cardiac arrest mechanism by which ECDs were causing SD events. Human study of the TASER X26 ECD has not reproduced these findings. These may be good examples of how animal research can lead to inaccurate conclusions when attempting to extrapolate animal study findings to human application. Additional concerns about using animal studies to form conclusions for human application include the weight discrepancy between the animals used and the typical human exposed to an ECD as well as anatomic differences and artificial anatomic manipulations of the animals.[40] Some authors of animal studies are aware of these limitations and have

written in the literature about their concerns in order to caution others from drawing conclusions that are too far-reaching from their work.[41]

The finding that humans uniformly have an increase in minute ventilation during ECD exposure is significant.[30] In arrest-related deaths such as this case involving JC, there are often allegations of breathing restriction made. This is of concern because in addition to the obvious mechanism of suffocation, restriction of breathing could be harmful if the person is in an exhausted physiologic state. In an exhausted condition, build-up of metabolic waste products (known as acidosis) requires that a person be able to increase their ventilatory status as a way to compensate for this. In doing so, it allows the waste product of carbon dioxide to be expired at a greater rate than normal and this allows their acidotic physiologic state to be buffered. That ECD exposure allows this respiratory compensation to occur makes this a very reasonable and logical tool to be used in situations such as this from a medical safety standpoint.

From a common sense standpoint, there is compelling evidence (in terms of sheer numbers of exposures) that an ECD exposure does not constitute a dangerous situation. This is based on the simple numbers of exposures on record with the TASER ECD manufacturer. To date, there are over 983,000 ± 7% voluntary exposures recognized by the manufacturer.[42] There have been no complaints of death following these exposures.[43] [44] This is significant if taken in the context of how a medical device or therapeutic drug would be ascertained to be safe to use on the general public in this country. In order to deem a medical device or therapeutic drug to be safe for public use, it must pass a series

of human clinical testing trials. These trials typically amount to less than a few thousand subjects without demonstrating harm. TASER ECDs have well surpassed this mark in terms of numbers with no reported consistent, associative complaints.

While there is not a clear existence of association between ECD use and SD, there is a clear existence of association between a certain profile of person at risk for SD events. This has been demonstrated in several research studies and texts and JC is represented by this profile in several ways including gender, body mass index, cocaine use, mental illness and underlying cardiac disease with extreme exertion/agitation preceding sudden collapse.[17 45 46 47 48] In this case, JC was an obese male, had a pre-disposing, underlying health condition (cardiomegaly, coronary artery disease and mental health issues) and had cocaine in his system at the time of his death. This, coupled with the significant exertional stress he elected to participate in with the police surrounding his collapse placed him at significant risk for sudden cardiac death due to arrhythmia and/or acidosis. All of these conditions were present in JC at his time of collapse and are independent of ECD application. To assign blame to the ECD in this situation is an over-simplification of the totality of JC's history and condition. It fails to address the other factors of importance such as prior health history, drug abuse and volitional resistance.

The factor of metabolic acidosis that was present in JC around the time of his collapse is significant. By definition, metabolic acidosis is a condition that is physiologically present whenever there is significant exertion being performed. JC was most certainly in this state of physiology at the time of his collapse based on the account of his significant violent exertion prior to the arrival of law enforcement officers. This was worsened

when he volitionally resisted against and struggled with the officers called to control the situation. This feature of agitation, resistance and struggling has been correlated with sudden death in the past.[17] JC's notable resistive behavior demonstrated a person with an elevated metabolic demand that was significant and defines a condition of metabolic acidosis. This condition is also known to be an associated risk for a sudden death event that is independent of the application of an ECD application.

JC's underlying condition of acidosis should not be underestimated. It was present prior to any ECD application due to his resistance. It was imperative that his behavior be brought under control immediately so as to not worsen his condition. In recent human study, it has been demonstrated that the use of an ECD to control behavior in humans with an underlying acidosis is likely a better choice in controlling them than other options such as continued grappling as this will create a situation of worsening acidosis (currently unpublished data).[28 49] This data also demonstrates very well that the application of an ECD in a human with this physiologic state uniformly does not worsen the acidosis or hypercatecholaminergic condition that is already present. This data also demonstrates that the absolute worst thing a person can do with regards to worsening their own physiology from an acidosis standpoint is to resist custodial control efforts. This behavior markedly worsens acidosis whereas ECD application does not.

Additionally, it is important to note that situations of having to control bizarre, agitated and violent persons with an ECD are not without risk. These situations, by definition, are always going to involve a high risk for significant injury or death to the subject, the law

enforcement officers, or both regardless of tools or tactics used. It is unreasonable to have law enforcement authorities solve this very volatile situation with the expectation of zero risk to the parties involved. This concept should not be underestimated and the inherent risk in this does not stem from the ECD as a tool. It stems from the volitional actions (such as actively resisting and being violent), as well as the underlying health and condition of the person (such as having heart disease, mental illness or using cocaine). When considering alternative means of control that are available (such as manual force, chemical weapons, canines, impact weapons or a firearm) the ECD has a risk:benefit ratio that would appear to be acceptable given the nature of the situation and the results of human study in this subject area.

Finally, I agree with the Suffolk County Medical Examiner's Office that JC was in a state of excited delirium at the time of his death and this was a direct cause of his death. I also agree that the underlying cocaine intoxication, cardiovascular disease and mental illness contributed to his demise. It is also my opinion that JC was at significant risk for a terminal arrhythmic event brought about by the stress of his elective physical resistance. JC represents a person with multiple factors associated with SD (male gender, higher body mass index, underlying coronary artery disease, cocaine usage, mental health history, exertional and resistive behavior) and all of these are completely independent of the application of an ECD.

I have also reviewed the conslusions and opinions from Dr. Lone Thanning and I do not agree with them. I am unsure how Dr. Thanning could conclude that the immediate

cause of death was ventricular fibrillation at autopsy (since no physical evidence of this would be present at autopsy) and I am unclear how he could come to this conclusion when the documentations supports an initial rhythm of asystole upon immediate resuscitation efforts.[50] Although asystole can be sometimes confused with a rhythm of very fine ventricular fibrillation, this should respond to defibrillation that was attempted in case the rhythm interpretation was in error. There was no success with this maneuver and this further supports the initial rhythm of asystole. Dr. Thanning also opines that a proximate cause of death was the repeated TASER device exposures. I disagree with this based on the numerous human research studies cited previously that do not show a rational or plausible connection between ECD application and SD in this case given the ECD application method, time course and locations. For Dr. Thanning to maintain this opinion suggests that he is either unfamiliar with the ECD and the available human research pertaining to it or that his opinion is somewhat disingenuous.

Conclusions

Based on the available ECD human research and my review of the totality of the documentation listed above, as well as my professional education, experience and background, it is my opinion, to a reasonable degree of medical certainty or probability, that the use of the TASER ECD did not cause or contribute to JC's death.

It is also my opinion that JC's pre-existing coronary artery disease, cardiomegaly, cocaine usage, mental health disorder and his resistive non-compliance contributed to his death by placing him at an elevated risk for a sudden arrhythmic event during his excited

delirium state. JC's elective decision to attempt to resist the police officers after physically exerting himself in front of his friends and family contributed to putting him at significantly elevated risk for a subsequent profound metabolic acidosis and cardiac arrhythmia.

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Jeffrey D. Ho, M.D., FACEP, FAAEM

EDUCATION:

DEGREE - Associate of Science (Criminal Justice/Law Enforcement)
Inver Hills Community College
Inver Grove Heights, Minnesota
March, 2005

FELLOWSHIP – Emergency Medical Services/Prehospital Care
Hennepin County Medical Center
Minneapolis, Minnesota
July, 1995 – June, 1996

RESIDENCY – Emergency Medicine
Hennepin County Medical Center
Minneapolis, Minnesota
May, 1992 – June, 1995

DEGREE – Doctor of Medicine
Loma Linda University School of Medicine
Loma Linda, California
August, 1988 – May 1992

DEGREE – Bachelor of Science (Biology/Zoology)
Loma Linda University College of Arts and Sciences
Riverside, California
September, 1984 – June, 1988

HONORS and AWARDS:

September, 2008 – Sheriff's Office Achievement Award
Meeker Count Sheriff's Office, Litchfield, Minnesota
*Awarded by peer committee to a single deputy annually for outstanding professionalism and service to the community including a lifesaving action while on-duty.

January, 2008 – Rescue Service Award
Minneapolis Police Department, Minneapolis, Minnesota
*Awarded for scene rescue effort provided during the Interstate 35W bridge collapse.

November, 2007 – Pistol Expert Award
Meeker County Sheriff's Office, Litchfield, Minnesota
*Awarded for mastery and marksmanship during firearm qualification.

January, 2007 – Top Doctor Award in Emergency Medicine
11th Annual MPLS/St. Paul Magazine, Minneapolis, Minnesota
*Presented annually to Twin City physicians upon receiving top nomination by their peers.

HONORS and AWARDS (continued)*:*

September, 2006 – Mark Rathke, MD Lecture Award
21st Annual MN EMS Medical Director Conference, Alexandria, Minnesota
*Presented annually to a distinguished lecturer in the area of local EMS in honor of a previous EMS physician who served the profession with dedication.

April, 2005 – Outstanding Accelerated Program Student Award
Inver Hills Community College, Inver Grove Heights, Minnesota
*Awarded by the college faculty in recognition of outstanding academic achievements in the accelerated law enforcement training program.

May, 2003 – Archibald Bush Foundation Medical Fellowship
Archibald Bush Foundation, St. Paul, Minnesota
*Competitively awarded as a career enhancement grant to allow me to pursue cross-training in law enforcement.

June, 2002 –Ernest Ruiz Teaching Award
Hennepin County Medical Center, Minneapolis, Minnesota
*Awarded by the senior residents in Emergency Medicine in recognition of outstanding teaching contributions within the residency training program.

May, 2002 – Chief's Award of Merit
Police Department, Minneapolis, Minnesota
*Awarded in recognition of outstanding leadership provided to the tactical paramedic program of the Emergency Response Unit.

December, 2001 – Service Award
Police Department, Minneapolis, Minnesota
*Awarded in recognition of service to the Emergency Response Unit.

January, 2000 –Meritorious Service Award
Fire Department, Minneapolis, Minnesota
*Awarded in recognition of meritorious and heroic service during the extrication and rescue of an accident victim resulting in the saving of a human life.

November, 1999 –Fellow of the American College of Emergency Physicians
ACEP Annual Meeting, Las Vegas, Nevada
*Fellow status is granted only after meeting stringent training, teaching and certification standards.

July, 1997 – Best Oral Presentation of Original Research Award
National Association of EMS Physicians Annual Meeting, Lake Tahoe, Nevada
*Awarded for presentation of a research project conducted during fellowship.

May, 1997 – Award of Recognition
Dakota County Technical School, Dakota County, Minnesota
*Awarded for providing mentorship in emergency medicine to high school students considering health care careers.

HONORS and AWARDS (continued)*:*

June, 1995 – James Andersen Scholarship Award
Hennepin County Medical Center, Minneapolis, Minnesota
*Annually awarded to a single senior resident who demonstrates excellence in leadership and clinical abilities in emergency medicine.

March, 1995 – University of Minnesota School of Medicine Resident Physician Distinguished Teaching Award Nominee
University of Minnesota School of Medicine, Minneapolis, Minnesota
*Nominated by the University of Minnesota senior medical students for excellence in academic and clinical teaching.

June, 1994 – Emergency Medicine Chief Resident
Hennepin County Medical Center, Minneapolis, Minnesota
*Selected by my colleagues to maintain and promote intra and interdepartmental leadership, rapport and education through a wide variety of administrative responsibilities.

February, 1993 – Resident Association Representative Elect
Hennepin County Medical Center, Minneapolis, Minnesota
*Elected by my peers to serve a 2 year term to represent my residency at the national level to the Emergency Medicine Residents Association of the American College of Emergency Physicians.

May, 1991 – California Medical Association Student Representative Elect
Loma Linda University School of Medicine, Loma Linda, California
*Elected by a state planning agency to serve on the Association's Committee for Emergency and Disaster Preparedness.

March, 1989 – CIBA/GEIGY Award
Loma Linda University School of Medicine, Loma Linda, California
*Awarded annually to a medical student for outstanding community service in medical related projects.

May, 1988 – Cum Laude Graduate
Loma Linda University College of Arts and Sciences, Riverside, California

May, 1985 through May, 1988 – Dean's List of Academic Achievement
Loma Linda University College of Arts and Sciences, Riverside, California

January, 1988 – Carnation Corporation Scholarship
Loma Linda University College of Arts and Sciences, Riverside, California
*For providing community service while maintaining standards of academic excellence.

January, 1986 – Howard O. Welty Scholarship
Loma Linda University College of Arts and Sciences, Riverside, California
*For achieving standards of academic excellence.

April, 1984 – Loma Linda University Academic Scholarship
Orangewood Adventist Academy, Garden Grove, California
*For academic excellence prior to entering undergraduate study

ACADEMIC APPOINTMENTS:

June, 2007 through Present – Associate Professor of Emergency Medicine

University of Minnesota School of Medicine
Twin Cities Campus, Minneapolis, Minnesota

July, 1996 through May, 2007 – Assistant Professor of Emergency Medicine
University of Minnesota School of Medicine
Twin Cities Campus, Minneapolis, Minnesota

CLINICAL EXPERIENCE:

July, 1996 through Present – Attending Faculty, Emergency Medicine
Hennepin County Medical Center (Level 1 Trauma Center)
Hennepin Faculty Associates, Minneapolis, Minnesota

June, 1996 through June, 1998 – Courtesy Staff Physician, Emergency Medicine
Ridgeview Medical Center, Waconia, Minnesota

November, 1993 through June, 1997 – Courtesy Staff Physician, Emergency Medicine
District Memorial Hospital, Forest Lake, Minnesota
United Hospital, St. Paul, Minnesota
Northfield Hospital, Northfield, Minnesota
Emergency Practice Associates, Faribault and Hibbing, Minnesota

MEDICAL DIRECTOR EXPERIENCE:

October, 2006 through July, 2007 – Expert Medical Consultant
City of Oakland, California
*Provide a comprehensive report on the human effects of conducted electrical weapons for the city administration as they move to implement these devices into their police department.

April, 2006 through 2009 – Medical Director
Fire Department, St. Louis Park, Minnesota
*Direct a fire-service based EMS program of 25 personnel.

March, 2006 through Present – Deputy Medical Director
Minnesota Task Force-1 Urban Search and Rescue Team, Minneapolis, Minnesota
*Provide leadership, operational ability and expert medical advice for a statewide specialized rescue team.

August, 2004 through Present – Expert Medical Consultant
TASER International, Scottsdale, Arizona
*Provide research expertise and expert medical advice for a company that manufactures conducted electrical weapons for law enforcement, military and civilian application.

January, 2003 through Decmber, 2003 – Medical Director
Medevac, Inc., Minneapolis, Minnesota
*Provide medical oversight, treatment protocols, standing orders, equipment and product evaluation for a company that provides basic life support instruction, automatic external defibrillator equipment and training and limited event emergency medical services.

MEDICAL DIRECTOR EXPERIENCE (continued)*:*

September, 2002 through November, 2003 – Chief Medical Officer
MN-1 Disaster Medical Assistance Team, Minneapolis, Minnesota
*Direct and participate on a team of medical personnel tasked for deployment by the Federal Office of Emergency Preparedness to national needs for emergency medical aid.

September, 1997 through May, 2001 – Medical Director & Tactical Physician
Police Department Emergency Response Unit, Minneapolis, Minnesota
*Direct and participate on a team of 10 medical personnel assigned to the SWAT team.

July, 1998 through Present – Director of EMS Fellowship Program
Hennepin County Medical Center, Minneapolis, Minnesota

May, 1997 through Present – Medical Director of Public Safety/Paramedic Services

Fire Department, Edina, Minnesota
*Direct a fire-service based paramedic program of 25 personnel.

July, 1996 through Present – Associate Medical Director of Paramedic Services
Hennepin County Ambulance Service, Minneapolis, Minnesota
*Assist with the direction of an urban, third-service based paramedic program of 110 personnel.

July, 1996 through Present – Director of Resident EMS Education
Hennepin County Medical Center, Minneapolis, Minnesota

July, 1996 through Present – Medical Director of Spectator Services
Hubert H. Humphrey Metrodome, Minneapolis, Minnesota
*Direct a stadium first-responder team of 60 personnel.

July, 1996 through July, 1998 – Medical Director of Spectator Services
Minneapolis Children's Grand Prix, Minneapolis, Minnesota
*Directed a fully enclosed race track based first-responder team of 20 personnel.

OTHER EXPERIENCE:

December, 2006 through Present – Deputy Sheriff
Meeker County Sheriff's Office, Meeker County, Minnesota
*Responsible for providing law enforcement services and protection of life and property to the surrounding community.

January, 2006 through December, 2006 – Police Officer
Dassel Police Department, Dassel, Minnesota
*Responsible for providing law enforcement services and protection of life and property to the surrounding community.

October, 2005 through Present – Examiner
American Board of Emergency Medicine, Lansing, Michigan
*Responsible for administering the oral examination to candidates pursuing board certification in emergency medicine.

OTHER EXPERIENCE (continued):

July, 2005 through January, 2007 – Police Officer
Buffalo Lake Police Department, Buffalo Lake, Minnesota
*Responsible for providing law enforcement services and protection of life and property to the surrounding community.

May, 1989 through June, 1990 – Clinic Director
Social Action Corps Clinic, Rialto, California
*Responsible for directing the efficient operation of a student-run medical clinic which provided low cost health care to an indigent population.

February, 1986 through May, 1988 – Fire Apparatus Engineer
Riverside County Fire Department, Riverside County, California
*Provided emergency medical service and fire suppression activities to the surrounding community.

November, 1984 through February 1986 – Firefighter
Riverside County Fire Department, Riverside County, California
*Provided emergency medical service and fire suppression activities to the surrounding community.

November, 1984 through May, 1988 – Firefighter
Home Gardens Volunteer Rescue Squad, Home Gardens, California
*Provided emergency medical and rescue services to the surrounding community on a volunteer basis.

MILITARY EXPERIENCE:

June, 1992 through September, 1998 – Army National Guard, Minnesota
Major, Medical Corps
434th Main Support Battalion and STARC Detachment 7
Cottage Grove and Minneapolis, Minnesota
Honorable Discharge

May, 1989 through June, 1992 – Army National Guard, California
Second Lieutenant, Medical Service Corps
143rd Evacuation Hospital
Los Alamitos, California
Honorable transfer to Minnesota

Military Awards Earned:
1. Army Reserve Component Achievement Award (1997)
2. Minnesota State Service Award (1997)
3. Army Award of Accomplishment (1996)
4. Army Service Award (1995)
5. National Defense Service Medal (1993)
6. Humanitarian Service Award (1989)
7. California Medal of Merit (1989)

ACADEMIC REVIEW EXPERIENCE:

2008 EMS1.com (EMS Medical Director Reviewer of academic content)
2008 Academic Emergency Medicine (Invited Reviewer)
2007-2008 Southern Medical Journal (Invited Reviewer)
2007-2008 American Journal of Emergency Medicine (Invited Reviewer)

ACADEMIC TEXTBOOK WORK:

Kroll MW and **JD Ho** (eds). TASER Electronic Control Devices: Physiology, Pathology, and Law. Berlin: Springer Science Media, In-Press 2009.

Lindquist MD and **JD Ho**. "Safety and Scene Size-Up" (ch. 9), "Documentation and Communication" (ch. 17), and "Teamwork and Operational Interface"(ch. 52). The Paramedic: A Comprehensive Textbook. Ed. W Chapleau, A Burba, and P Pons. Dubuque: McGraw-Hill Higher Education, 2008.

Ackermann B and **J Ho**. "Continuum of Force." (ch. 4) Tactical Emergency Medicine. Ed. R Schwartz, J McManus and R Swienton. Lippincott, Williams and Wilkins, 2007.

PUBLICATIONS:

Heegaard W, **Ho J** and D Hildebrandt: The prehospital ultrasound study: Results of the first six months. *Prehosp Emerg Care*, 2009;13:139.

Ho J: Human Cardiorespiratory and acid/base effect of a civilian-conducted electrical weapon. *Prehosp Emerg Care*, 2009;13:94-95.

Dawes D, **Ho J**: Letter to the Editor, "Fortuitous therapeutic effect of TASER shock" misleading (On Richards #2008-267). *Ann Emerg Med*, 2009;53:286-287.

Ho J, Heegaard W, Dawes D, Miner J, et al: Unexpected arrest-related deaths in America: 12 months of open source surveillance. *West J Emerg Med*, 2009;In Press.

Dawes D, **Ho J** and J Miner: Echocardiographic evaluation of TASER X26 probe deployment into the chests of human volunteers. *Am J Emerg Med*, 2009;In Press.

Dawes D, **Ho J** and J Miner: The neuroendocrine effects of the TASER X26: A brief report. *Forensic Sci Int*, 2009;183:14-19.

Ho J, Dawes D, Reardon R, et al: Echocardiographic evaluation of a TASER X26 application in the ideal human cardiac axis. *Acad Emerg Med*, 2008;15:838-844.

Hick J, **Ho J**, et al: Emergency medical services response to a major freeway bridge collapse. *Disaster Medicine and Public Health Preparedness*, 2008;2:S17-S24.

Ho J, Miner J, Dawes, D, et al: Reply to Letter (Conflict of interest in research by A O'Brien). *Am J Emerg Med*, 2008;26:504-505.

Ho J, Dawes D: Weapon retention in the home. *Cop to Cop News* 2008;5(issue 2).

Ho J, Lapine A, Joing S, et al: Confirmation of respiration during trapezial conducted electrical weapon application. *Acad Emerg Med*, 2008;15:398.

Ho J, Dawes D: The TASER device and custodial death. *Cop to Cop News* 2008;5(issue 1).

Ho J: Rhetoric vs. Reality, The Medical Effect of TASERs (commentary). *Emerg Med News* 2008; 30:4, 6.

Ho J, Dawes D, Johnson M, et al: TASER research conflict of interest (reply to letter to the editor). *Am J Emerg Med*, 2008; In Press.

PUBLICATIONS (continued):

Ho J, Dawes D: Influenza Issues. *Cop to Cop News* 2007;4(issue 4).

Ho J, Hick J, Heegaard W: Physician Perspective of the 35W Bridge Collapse: A Tragedy to Learn From. *Metro Doctors* 2007; Nov/Dec:18-19.

Dawes D, **Ho J**, Johnson M, et al: 15-Second conducted electrical weapon exposure does not cause core temperature elevation in non-environmentally stressed resting adults. *Forensic Sci Int* 2008;176:253-257.

Ho J, Dawes D: The Diabetic Dilemma. *Cop to Cop News* 2007;4(issue 3).

Ho J: How to Respond to Excited Delirium. *POLICE* 2007;31:28-30

Ho J: Are TASERS Really Non-Lethal? *POLICE* 2007;31:32-38 and *New South Wales Police News* 2007;87:15-17.

Ho J, Dawes D, Johnson M, et al: Impact of Conducted Electrical Weapons in a Mentally Ill Population: A Brief Report. *Am J Emerg Med* 2007;25:780-785.

Ho J, Dawes D, Bultman L, et al: Prolonged TASER use on exhausted humans does not worsen markers of acidosis. *Am J Emerg Med*, 2008;In Press.

Dawes D, **Ho J**: Staph on the streets – Keeping infection free. *24/7 Cop to Cop News* 2007;4(issue 2):10.

Ho J, Johnson M, and D Dawes: "The state of current human research and electronic control devices." Nonlethal Weapons: Fulfilling the Promise? Fraunhofer Institut Chemische Technologie. Karlsruhe: DWS Werbeagentur und Verlag GmbH, 2007.

Ho J, Heegaard W and D Brunette: Successful transcutaneous pacing in 2 severely hypothermic patients. *Ann Emerg Med* 2007;49:678-681.

Ho J, Dawes D, Bultman L, et al: Respiratory effect of prolonged electrical weapon application on human volunteers. *Acad Emerg Med*, 2007;14:197-201.

Ho J and R Scharbach: Dispositifs Taser et effets physiologiques sur l'homme. *La Revue des SAMU* 2006; speciale Septembre :260.

Ho J: Are TASERS really non-lethal? *POLICE* 2007; 31:32-38.

Ho J: How to respond to excited delirium. *POLICE* 2007;31:28-30.

Ho J, Miner J, Lakireddy D, Bultman L and W Heegaard: Cardiovascular and physiologic effects of conducted electrical weapon discharge in resting adults. *Acad Emerg Med* 2006;13:589-595.

Ho J: Some More Food for Thought on the Current TASER Device Literature. *American College of Emergency Physicians Tactical EMS Interest Group Newsletter* 2005; 3rd Quarter.

Ho J: Sudden In-Custody Death. *POLICE* August 2005; 29:46-56.

PUBLICATIONS (continued):

Martel M, Miner J, Fringer R, Sufka K, Miamen A, **Ho J**, et al: Discontinuation of Droperidol for the Control of Acutely Agitated Out-of-Hospital Patients. *Prehosp Emerg Care* 2005; 9:44-48.

Hick JL and **JD Ho**: [Case Report] Ketamine chemical restraint to facilitate rescue of a combative "jumper". *Preshosp Emerg Care* 2005;9:85-89.

Ho J: Last Night (reflections piece). *Acad Emerg Med* 2003; 10:1023.

Ho J, Lindquist M, Bultman L, Torstenson C: Apathy is not Welcome Here (editorial). *Prehosp Emerg Care* 2003; 7:414-416.

Ho J, Conterato M, Mahoney B, et al: [Case Report] Field Extremity Amputation with Subsequent Cardiac Arrest. *Prehosp Emerg Care* 2003; 7:149-153.

Ho J, Lindquist M: The Time Saved with the Use of Emergency Warning Lights and Siren While Responding to Requests for Medical Aid in a Rural Environment. *Prehosp Emerg Care* 2001; 5:159-162.

Ho J: Response vs. Transport Times (letter to ed.). *Emerg Med News* 2000; 22:38.

Ho J: Misplaced Tubes (letter to ed.). *Prehosp Emerg Care* 2000; 4:202.

Ho J: Tactical EMS Team Contributions. *Minneapolis Police Department After Action Report for International Society of Animal Geneticists Mass Gathering Incident*; July, 1999.

Reed D, Gough J, **Ho J**, et al: Prehospital Consideration of Sildenafil-Nitrate Interactions. *Prehosp Emerg Care* 1999; 3:306-309.

Ho J: Lights and Sirens or Silence? (commentary). *Emerg Med News* 1999; 21:2, 36 .

Ho J, Casey B: Emergency Warning Lights and Sirens (reply to letter). *Ann Emerg Med* 1999; 34:114-115.

Ho J, Casey B: The Time Saved With the Use of Emergency Warning Lights and Sirens While Responding to Requests for Emergency Medical Aid. *Ann Emerg Med* 1998; 32:585-588.

Ho J, Held T, Heegaard W, et al: Automatic External Defibrillation and its Effects on Neurologic Outcome in Cardiac Arrest Patients in an Urban Two-Tiered EMS System. *Prehosp Disaster Med* 1997; 12:284-287.

Green S, Rothrock S, **Ho J**, et al: Failure of Adjunctive Bicarbonate to Improve Outcome in Severe Pediatric Diabetic Ketoacidosis. *Ann Emerg Med* 1998; 31:41-48.

GRANT EXPERIENCE:

October, 2008 - $130,000.00
Source: TASER International, Inc.
Project: Safety Testing of a 40 mm Conducted Electrical Weapon

December, 2007 - $130,000.00
Source: TASER International, Inc.
Project: Effect of TASER Device Exposure in Combination with Methamphetamine in a Swine Model.

August, 2007 - $10,000.00
Source: Twin Cities Metropolitan EMS Board
Project: Portable Carbon Monoximetry Utility in a Firefighting Rehabilitation Zone.

May, 2003 - $56,000.00
Source: Archibald Bush Foundation Medical Fellowship Grant
Project: Physician cross-training in law enforcement to provide emergency medical care in tactical, high-risk environments.

January, 1998 - $75,000.00
Source: American International Health Alliance
Project: The Effect of Introducing Automatic External Defibrillation Upon the Citizens of an Emerging Country (Republic of Moldova)

December, 1997 - $7,500.00
Source: Twin Cities Metropolitan EMS Board
Project: The Effect of Utilizing ALS "Jump Cars" Within a Two-Tiered EMS System

October, 1995 - $4,000.00
Source: Twin Cities Metropolitan 911 Board
Project: The Time Saved With the Use of Emergency Warning Lights and Sirens While Responding to Requests for Emergency Medical Aid in and Urban Environment

FORMAL PRESENTATIONS:

February, 2009 – American Academy of Forensic Science Annual Meeting
Denver, Colorado
Ho J: Conducted Electrical Weapons – A Review of the Medical Literature
*Oral presentation of a literature review

February, 2009 – American Academy of Forensic Science Annual Meeting
Denver, Colorado
Ho J: TASER Wound Progression in Two Deployment Modes
*Poster presentation of original research

January, 2009 - National Association of EMS Physicians Annual Meeting
Jacksonville, Florida
Ho J: Human Cardiorespiratory and Acid/Base Effect of a Civilian Conducted Electrical Weapon
*Oral presentation of original research
Heegaard W, Hildebrandt D and **J Ho**: The Prehospital Ultrasound Study: Results of the First 6 months.
*Poster presentation of original research

FORMAL PRESENTATIONS (continued):

January, 2009 – Caribbean Emergency Medicine Congress

Bridgetown, Barbados
Ho J: Introduction of the conducted electrical weapon in the hospital setting: 8 months of use
Dawes D and **J Ho**: The Physiologic Effects of Multiple Simultaneous Electronic Control Device Discharges
Dawes D and **J Ho**: The neuro-endocrine effects of the TASER X26 conducted electrical weapon
*Poster presentations of original research

September, 2008 – European Society of Emergency Medicine
Munich, Germany
And
The National Association of Medical Examiners
Louisville, Kentucky
Ho J: Serum Biomarker Effect of Prolonged TASER® XREP Device Exposure
Dawes D and **J Ho**: The Effects of the eXtended Range Electronic Projectile (XREP) on Breathing
Dawes D and **J Ho**: Electrocardiographic evaluation of a long-range electronic control device (ECD) exposure in human volunteers
*Poster presentations of original research

July, 2008 – Australian College of Emergency Medicine
Newcastle, Australia
Ho J: Cardiac and Diaphragm Echo Evaluation During TASER Device Drive Stun
Dawes D and **J Ho:** 1) The Effects of the Extended Range Electronic Projectile (XREP) on Breathing; 2) The Effect of a Cross-Chest Electronic Control Device Exposure on Breathing; 3) Echocardiographic Determination of Cardiac Rhythm During Trans-Thoracic Wireless Conducted Electrical Weapon Exposure
*Poster presentations of original research

May, 2008 – Heart Rhythm Society Annual Meeting
San Francisco, California
And
June, 2008 – CARDIOSTIM
Nice, France
Ho J: Echocardiographic Evaluation of Human Transcutaneous TASER® Application Along the Cardiac Axis
*Poster presentation of original research

January, 2008 – National Association of EMS Physicians Annual Meeting
Phoenix, Arizona
And
June, 2008 – Canadian Association of Emergency Physicians Annual Meeting
Ottawa, Canada
Ho J: Prolonged TASER® "Drive Stun" Exposure in Humans Does Not Cause Worrisome Biomarker Changes
*Poster presentation of original research

FORMAL PRESENTATIONS (continued):

October, 2007 – American College of Emergency Physicians Research Forum
Seattle, Washington
and
September, 2007 – Fourth Mediterranean Emergency Medicine Congress
Sorrento, Italy
Ho J: Ultrasound Measurement of Cardiac Activity During Conducted Electrical Weapon Application in Exercising Adults.
*Poster presentation of original research

September, 2007 – Fourth Mediterranean Emergency Medicine Congress
Sorrento, Italy
Ho J: Absence of Electrocardiographic Change Following Prolonged Application of a Conducted Electrical Weapon in Physically Exhausted Adults.
*Poster presentation of original research

October, 2007 – American College of Emergency Physicians Research Forum
Seattle, Washington
and
September, 2007 – Fourth Mediterranean Emergency Medicine Congress
Sorrento, Italy
Dawes D, **Ho J**: Breathing Parameters, Venous Gases, and Chemistries with Exposure to a New Wireless Projectile Conducted Electrical Weapon.
*Poster presentation of original research

October, 2007 – American College of Emergency Physicians Research Forum
Seattle, Washington
and
September, 2007 – Fourth Mediterranean Emergency Medicine Congress
Sorrento, Italy
Dawes D, **Ho J**: The Neuroendocrine Effects of the TASER X26 Conducted Electrical Weapon as Compared to Oleoresin Capsicum.
*Poster presentation of original research

October, 2007 – American College of Emergency Physicians Research Forum
Seattle, Washington
and
September, 2007 – Fourth Mediterranean Emergency Medicine Congress
Sorrento, Italy
Dawes D, **Ho J**: 15-Second Conducted Electrical Weapon Exposure Does Not Cause Core Temperature Elevation in Non-Environmentally Stressed Resting Adults.
*Poster presentation of original research

September, 2007 – Fourth Mediterranean Emergency Medicine Congress
Sorrento, Italy
Dawes D, **Ho J**: 15-Second Conducted Electrical Weapon Application Does Not Impair Basic Respiratory Parameters, Venous Blood Gases, or Blood Chemistries.
*Poster presentation of original research

May, 2007 – Annual Meeting of the Society for Academic Emergency Medicine, Chicago, Illinois
Ho J, et al: Physiologic Effects of Prolonged Conducted Electrical Weapon Discharge on Acidotic Adults
*Poster presentation of original research

FORMAL PRESENTATIONS (continued):

May, 2007 – Annual Meeting of the Society for Academic Emergency Medicine, Chicago, Illinois
Ho J, et al: Absence of Electrocardiographic Change Following Prolonged Application of a Conducted Electrical Weapon in Physically Exhausted Adults
*Poster presentation of original research

May, 2007 – Annual Meeting of the Society for Academic Emergency Medicine, Chicago, Illinois
Moscati R, **Ho J**, et al: Physiologic Effects of Prolonged Conducted Electrical Weapon Discharge on Intoxicated Adults
*Poster presentation of original research

June, 2006 – Annual Meeting of the National Alliance for the Mentally Ill Washington, D.C.
Dawes D, **Ho J**, et al: Beneficial Impact of Conducted Electrical Weapons in the Mentally Ill Population
*Poster presentation of original research

June, 2006 – CARDIOSTIM 2006 Annual Meeting of International Cardiac Electrophysiologists
Nice, France
Ho J, et al: Absence of Electrocardiographic Findings Following TASER Device Application in Human Volunteers
*Poster presentation of original research

September, 2005 – 2005 Scientific Assembly of the American College of Emergency Physicians
Washington, D.C.
Ho J, et al: Deaths in Police Custody: An 8-Month Surveillance Study
*Poster presentation of original research

September, 2005 – Third Mediterranean Emergency Medicine Congress
Nice, France
Ho J, et al: Deaths in American Police Custody: A 12-Month Surveillance Study
*Oral Presentation of original research

January, 2005 – Annual Meeting of the National Association of EMS Physicians, Naples, Florida
Bultman L, **Ho J**, Page D: Safety Restraint Usage Patterns in an Urban EMS System
*Poster presentation of original research

January, 2005 – Annual Meeting of the National Association of EMS Physicians, Naples, Florida
Bultman L, **Ho J**, Page D: Disposition of Undesignated patients in Urban Minnesota
*Poster presentation of original research

September, 2004 – Minnesota Ambulance Medical Directors Annual Conference, Alexandria, Minnesota
Bultman L, **Ho J**, Page D: Preliminary Report on Undesignated Patient Disposition in Urban Minnesota
*Oral presentation of original research

FORMAL PRESENTATIONS (continued):

January, 2004 – Annual Meeting of the National Association of EMS Physicians, Tucson, Arizona
Ansari R, **Ho J**: Hand Sanitization Rates in an Urban EMS System
*Oral presentation of original research,
*Awarded Best Oral Presentation of Original Research

January, 2001 – Annual Meeting of the National Association of EMS Physicians, Sanibel Island, Florida
Black C, **Ho J**: 1 Paramedic vs. 2-How Often is a Second Paramedic Utilized in an Urban EMS System?
*Poster presentation of original research

September, 1997 – Minnesota Ambulance Medical Directors Annual Conference, Alexandria, Minnesota
Ho J: Preliminary Report on the Time Saved with the Use of Emergency Warning Lights and Siren While Responding to Requests for Medical Aid in a Rural Environment.
*Oral presentation of original research

May, 1997 – Annual Meeting of the Society for Academic Emergency Medicine, Washington, D.C.
Ho J: Time Saved with the Use of Emergency Warning Lights and Sirens While Responding to Requests for Medical Aid.
*Poster presentation of original research

January, 1997 – Mid-Year Scientific Meeting of the National Association of EMS Physicians, Lake Tahoe, Nevada
Ho J: Time Saved with the Use of Emergency Warning Lights and Sirens While Responding to Requests for Medical Aid.
*Oral presentation of original research
*Awarded Best Oral Presentation of Original Research

November, 1996 – Twin Cities Metropolitan 911 Board, St. Paul, Minnesota
Ho J: Final Report on the Time Saved with the Use of Emergency Warning Lights and Sirens While Responding to Requests for Medical Aid in Minneapolis.
*Oral presentation of original research

May, 1996 – Annual Meeting of the Society for Academic Emergency Medicine, Denver, Colorado
Ho J: Automatic External Defibrillation and its Effects on Neurologic Outcome in Cardiac Arrest Patients in an Urban Two-Tiered EMS System.
*Poster presentation of original research

May, 1996 – Annual Meeting of the Society for Academic Emergency Medicine, Denver, Colorado
Ho J: The Utility of the Routine Swimmers View Cervical Radiograph in Addition to the Cross Table Lateral Cervical Radiograph in Detecting Cervical Spine Injury in Critical Trauma Patients.
*Poster presentation of original research

May, 1995 – Clinical-Pathologic Case Competition at the Annual Meeting of the Society for Academic Emergency Medicine, San Antonio, Texas
Ho J: Cutaneous Actinomycosis
*Oral presentation of a case study

INVITED PRESENTATIONS:

December, 2008– Meeker County Sheriff's Office Prisoner Treatment Training

Litchfield, Minnesota
Ho J: Custodial Arrest-Related Death Physiology for Law Enforcement
* Oral presentation of Custodial Death causes, prevention and awareness.

October, 2008 – Association of Training Officers of Minnesota Fall Conference
Plymouth, Minnesota
Ho J: Custodial Death Issues for Law Enforcement
*Oral presentation of Custodial Death causes, prevention and awareness.

October, 2008 – LifeLink III Trauma Tactics Conference
Red Wing Minnesota
Ho J: Custodial Death Issues for EMS Responders
*Oral presentation of Custodial Death causes, prevention and awareness.

October, 2008 – Overland Park Public Safety Presentation
Overland Park, Kansas
Ho J: Sudden Arrest Related Death and The TASER Device
*Oral presentation of sudden death current medical research involving TASER devices

September, 2008 – Multijurisdictional Law Enforcement Authority Presentation (Germany, Austria, Switzerland)
Munich, Germany
Ho J: The TASER Device Human Research Update
*Oral presentation of current medical research involving TASER devices

July, 2008 – Australian Law Enforcement Official Presentation
Sydney, Australia
Ho J: The TASER Device Human Research Update
*Oral presentation of current medical research involving TASER devices

May, 2008 – Braidwood Commission
Vancouver, Canada
Ho J: Testimony
*Oral presentation of sworn testimony on numerous research findings involving TASER devices

May, 2008 – Bloomington Police Department Citizen Academy Night
Bloomington, Minnesota
Ho J: TASER Devices – An Evening With The Experts
*Oral presentation of current medical research involving TASER devices

April, 2008 – MN State Patrol Drug Recognition Evaluator School
White Bear Lake, Minnesota
Ho J: Human Function and Physiology
*Oral presentation of core course content topic for law enforcement officials

January, 2008 – Association of Training Officers of Minnesota Winter Conference
Minneapolis, Minnesota
Ho J: Custodial Death Issues for Law Enforcement
*Oral presentation of Custodial Death causes, prevention and awareness.

INVITED PRESENTATIONS (continued):

November, 2007 – 2nd Annual Conference of the Institute for the Prevention of In Custody Death
Las Vegas, Nevada
Ho J: Human Research on Conducted Electrical Weapons

*Oral presentation of past, present and future human research involving electrical weaponry

October, 2007 – German Military and National Police Scientific Annual Meeting
Berlin, Germany
Ho J: Conducted Electrical Weapons: Update of Current Research
*Oral presentation to the German National military and police scientific community on current research in this subject area

August, 2007 – Baltimore Medical Examiner's Office In-House Training
Baltimore, Maryland
Ho J: The State of Current Human Research and Electronic Control Devices(ECDs)
*Oral presentation to forensic scientific community on the current research in this subject area

June, 2007 – 29th Annual BioElectroMagnetic Society Meeting
Kanazawa, Japan
Ho J: The State of Current Human Research and Electronic Control Devices(ECDs)
*Oral presentation to an international scientific community on the current research in this subject area

May, 2007 – 4th European Symposium on Non-Lethal Weapons
Ettlingen, Germany
Ho J: The State of Current Human Research and Electronic Control Devices(ECDs)
*Oral presentation to European military and law enforcement leadership on the current research in this subject area

March, 2007 – City Council Task Force Meeting
Palo Alto, California
Ho J: TASER Devices and Human Effects – What can research tell us?
*Oral testimony to city officials and the lay public of current research as they debate moving towards deployment of conducted electrical weapons in their city

March, 2007 – MN Reserve Police Officer Association Annual Meeting
Brooklyn Park, Minnesota
Ho J: Custodial Death and Intermediate Weapons
*Oral presentation to membership about the custodial death phenomenon

January, 2007 – Minnesota Bureau of Criminal Apprehension
St. Paul, Minnesota
Ho J: Medical Considerations in Sudden Custodial Death Investigations
*Oral presentation to state investigators about the custodial death phenomenon

December, 2006 – An Garda Siochaina (Irish National Police Agency)
Dublin, Ireland
Ho J: Conducted Electrical Weapon Research Update
*Oral presentation of pertinent safety research given to the police administration as they move towards deployment of conducted electrical weapons in Ireland

INVITED PRESENTATIONS (continued):

December, 2006 – Accident and Emergency Physicians Association of Ireland
Dublin, Ireland
Ho J: Comprehensive Analysis of Custodial Death and Conducted Electrical Weapons
*Oral presentation of the custodial death phenomenon and how it relates to the introduction of electrical weapons into society

November, 2006 – Meeker County Sheriff's Office Use of Force Update
Litchfield, Minnesota
Ho J: Electronic Control Device and Use of Force Physiology for Law Enforcement
*Oral Presentation of human response to electronic control device applications

November, 2006 – 1st Annual Conference of the Institute for the Prevention of In Custody Death
Las Vegas, Nevada
HoJ: Human Research on Conducted Electrical Weapons
*Oral presentation of past, present and future human research involving electrical weaponry.

November, 2006 – Grand Rounds for the Faculte' de Medecine Rene Descartes Paris 5 School of Medicine
Paris, France
Ho J: Conducted Electrical Weapon Controversies and Research
*Oral presentation of experience and research to prepare their providers for patient care issues as France begins to deploy electrical weapons to their police forces.

September, 2006 – 21st Annual MN EMS Medical Director Conference
Alexandria, Minnesota
Ho J: Issues of In Custody Death for EMS Providers
*Oral presentation on the interface of EMS providers with the phenomenon of sudden, unexpected death of persons in law enforcement custody.

June, 2006 – US Department of Defense and National Institute of Justice Human Electro-Muscular Incapacitation Device Conference
Quantico, Virgina
Ho J: Conducted Electrical Weapon Human Research Update
*Oral presentation on the state of research involving electronic weapons and their effects on human subjects.

May, 2006 – TASER International Domestic Tactical Conference
Las Vegas, Nevada
Ho J: TASER Device Medical Research Update
*Oral presentation of current medical research specifically involving TASER devices

2005-2007 – Minneapolis Police Crisis Intervention Tactics Training
Various locations within Minnesota
Ho J: Custodial Death in the Mentally Ill Population
*Oral presentation at a recurring training class sponsored by the Barbara Schneider Foundation to train law enforcement officers in specific tactics for dealing with mentally ill subjects.

INVITED PRESENTATIONS (continued):

March, 2009 – California (Los Angeles County Sheriff's Office)
April, 2008 – California (California Highway Patrol)
November, 2007 – Hawaii (Honolulu Police Department)
September, 2007 – Canada (Vancouver Police Department)
March, 2007 – Virginia (Prince William County Sheriff's Office)
December, 2006 – Canada (Toronto Police Department)
November, 2006 – California (Oakland Police Department)
October, 2006 – Illinois (Chicago Police Department)
August, 2006 – Colorado (Colorado Springs Police Department)
July, 2006 – Oregon (Portland Bureau of Police)
June, 2006 – Ohio (Cleveland Police Department)
June, 2006 – Nice, France (CARDIOSTIM/French National Police)
March, 2006 – California (Santa Ana Police Department)
February, 2006 – California (San Diego County Sheriff's Office)
December, 2005 – Scottsdale, Arizona (TASER International)
October, 2005 – Scottsdale, Arizona (TASER International)
Ho J: TASER Device Human Research Update
*Recurring Lecture Series: TASER Police Executive Conference; Oral presentation of theories of In Custody Death based on history and medical literature addressing concerns of the roles that TASER devices play in this phenomenon

December, 2005 – NM Police Chief Association, Albuquerque, New Mexico
November, 2005 – Public Information Forum, Gary, Indiana
September, 2005 – International Association of Chiefs of Police, Miami, Florida
August, 2005 – Kansas Law Enforcement Conference, Topeka, Kansas
July, 2005 – Houston Area Public Safety Forum, Houston, Texas
June, 2005 – PRIMA Annual Meeting, Milwaukee, Wisconsin
June, 2005 – San Jose Police Management Meeting, San Jose, California
May, 2005 – National League of Cities Public Safety Council, Reno, Nevada
Ho J: In Custody Death Issues
*Oral presentation of medical literature, research data and experience

April, 2005 – TASER International Domestic Tactical Conference
Scottsdale, Arizona
Ho J: In Custody Death and Law Enforcement Considerations
*Oral presentation of medical literature, research data and experience

June, 2004 – Metro Atlanta Police Chiefs Association
Atlanta, Georgia
Ho J: Medical Considerations for In-Custody Deaths
*Oral presentation of medical literature and experience

December, 2002-present – Hopkins High School (ISD 270) Healthcare Career Class
Hopkins, Minnesota
Ho J: A Career in Emergency Medicine
*Oral presentation given annually to high school seniors considering careers in medicine

September, 2002 – Annual Meeting of the International Rescue Association
Bloomington, Minnesota
Ho J: Ballistic Considerations for Field EMS Personnel
*Oral presentation of continuing medical education

INVITED PRESENTATIONS (continued):

May, August, September and October, 2000 – Annual Meetings of the Hennepin County Medical Center Trauma Team; Minnesota ACEP; Minnesota Ambulance Medical Directors; and LifeLink III Prehospital Providers; Bloomington, Brainerd, Alexandria and Red Wing, Minnesota
Ho J: Rescue on Interstate 35
*Oral presentations of a case study

September, 1999 – EMS Personnel Instruction at Republican Trauma Hospital Chisinau, Moldova
Heegaard W, **Ho J**: Automatic External Defibrillation
*Oral presentation of continuing medical education and research proposal

May, 1998 – Trauma Grand Rounds at Careggi Medical and Trauma Center, Florence, Italy
Ho J: American Emergency Medical Services
*Oral Grand Rounds presentation

May, 1998 – Trauma Grand Rounds at Republican Trauma Hospital Chisinau, Moldova
Ho J: Advances in Trauma Care
*Oral Grand Rounds presentation

January, 1998 – Minnesota Tactical EMS Conference Minneapolis, Minnesota
Ho J: Firearm Injuries
*Oral presentation of continuing medical education

January, 1998 – Augsburg College Physician Assistant Training Program Minneapolis, Minnesota
Ho J: An Introduction to Emergency Medical Services
*Oral presentation of continuing medical education

January, 1997 – Emergency Medicine Grand Rounds at Loma Linda University Loma Linda, California
Ho J: Controversies in EMS
*Oral Grand Rounds presentation

February, 1996 – Annual Meeting of the Arrowhead EMS Association Duluth, Minnesota
Ho J: Initial Patient Assessment – Everything You Need to Know
*Oral presentation of continuing medical education

August, 1995 – The University of Costa Rica College of Medicine National Symposium on Emergency Health Care San Jose, Costa Rica
Ho J: Advances in Cardiac Care and Emergency Management of HIV Patients
*Oral presentations of continuing medical education

LOCAL ACADEMIC LECTURES:

- **2008: Geriatric Trauma and Vulnerable Adults** – resident education
- **2007 to Present: Behavioral Emergencies** – paramedic student education
- **November, 2006: In-Custody Death Events** – paramedic education
- **2003 to Present: The Violent Patient** – resident education
- **2002 to Present: The Difficult Patient Encounter** – resident education
- **1996 to Present: Medical Student Introduction to the EMS System**
- **1996 to Present: Residency Update on the State of EMS**
- **September, 1995: Allergic Reactions** – paramedic education
- **April, 1995: Basic Head Trauma Management** – paramedic education
- **March, 1995: Emergency Cardiac Care Update** – paramedic education
- **March, 1995: Adrenal Emergencies** – paramedic education
- **October, 1994: Ophthalmologic Emergencies** – resident education
- **September, 1994: Fluid Resuscitation in Thermal Injuries** – resident education
- **May, 1994: Cardiopulmonary Emergencies** – paramedic education
- **October, 1993: Cocaine Related Chest Pain** – resident education
- **May, 1993: Rectal Foreign Bodies** – resident education
- **April, 1993: Acute Pancreatitis** – resident education

COMMITTEE EXPERIENCE:

Chair

- **2002 to 2004: Hennepin County EMS Council/Medical Director Subcommittee**
- **1998 to 2002: Hennepin County EMS Council/Paramedic Subcommittee**
- **1997 to Present: Minnesota Chapter, American College of Emergency Physicians EMS Committee**
- **1996 to 1997: Hennepin County Medical Center Patient Retention Task Force**
- **1996 to 1998: Hennepin County EMS Council/Paramedic Education Task Force**

Boards of Directors

- **2006 to Present: MN EMS Medical Directors Education Association, Inc. (President)**
- **2004 to 2006: MN EMS Medical Directors Education Association, Inc. (Secretary/Treasurer)**
- **1996 to 1997: Minnesota Chapter, American College of Emergency Physicians**
- **1995 to 1998: Minnesota Association of EMS Physicians**

COMMITTEE EXPERIENCE (continued):

Member

- 2008 to Present: American College of Emergency Physicians Task Force on Excited Delirium
- 2006 to 2007: Hospital Security Task Force, Hennepin County Medical Center
- 2003 to Present: American College of Emergency Physicians Section on Tactical EMS
- 2000 to 2001: Minneapolis Civil Disturbance Planning Committee
- 1999 to Present: Minnesota Annual Ambulance Medical Director Retreat Planning Committee
- 1997 to 2000: LifeLink III Aeromedical Transport Medical Advisory Committee
- 1997 to Present: Hennepin County EMS Council Medical Standards Committee
- 1997 to Present: Hennepin County EMS Council
- 1995 to 1998: Hennepin County EMS Council/Paramedic Subcommittee
- 1995 to 1996: Hennepin County Medical Center Trauma Multidisciplinary Committee

PROFESSIONAL ASSOCIATIONS:

- American College of Emergency Physicians – Fellow
- American Academy of Emergency Medicine - Fellow
- American Board of Emergency Medicine – Diplomate
- American Board of Emergency Medicine – Oral Examiner
- Society of Academic Emergency Medicine - Member
- National Association of EMS Physicians – Member
- International Association of Chiefs of Police – Member
- National Sheriffs' Association - Member
- Fraternal Order of Police – Member
- MN Professional Peace Officer Association – Member
- Archibald Bush Foundation – Senior Medical Fellow

LICENSURE & CERTIFICATION:

- Minnesota Peace Officers Standards and Training Board, License #18203
- Fellow of the American College of Emergency Physicians #355932
- Fellow of the American Academy of Emergency Medicine
- Diplomate of the American Board of Emergency Medicine-1997
  Recertified 2006
- Diplomate of the National Board of Medical Examiners-1994
- Minnesota Medical License #36894
- Nevada Medical License #8083 (inactive)
- ACLS/APLS/ATLS provider and instructor certified
- PALS provider certified
- TASER operator and instructor certified
- Minnesota Emergency Vehicle Operator Certification
- Minnesota Police Pursuit Vehicle Operator Certification
- Minnesota Police Pursuit Intervention Tactics (PIT) Certification
- Tactical EMS/SWAT Physician Certification
- California Firefighter Certification

REFERENCES:

- Excellent references provided upon request